Original Article

Correlation between Methylation and Expression Level of P15 and P16 Genes during Differentiation of Cord Blood Stem Cells into Erythroid Lineage Mediated by Erythropoietin

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Abstract

Background: Several influential factors such as transcription factors and intracellular signaling components are involved in differentiation of stem cells into a specific lineage. P15 and p16 proteins are among these factors. Accumulating evidences has introduced the epigenetic as a master regulator of these factors during lineage specification. The main objective of this study is to determine the correlation between the expression level and methylation pattern of P15 and P16 genes in erythroid lineage after in vitro differentiation by erythropoietin (EPO).

Materials and Methods: The purified and expanded CD34+ cord blood stem cells were differentiated into erythroid lineage in the presence of EPO. DNA was isolated from both cord blood stem cells and differentiated cells. The Real-Time PCR performed using cDNA and the isolated DNA was used in methylation Specific PCR (MSP) reaction for methylation pattern analysis in both pre and post differentiation stages.

Results: The study demonstrated that P15 and P16 genes have partial methylation after erythroid differentiation by EPO. The Expression of P15 gene was higher after differentiation and the expression of P16 gene had a slightly decreased level in post differentiation stage.

Conclusion: Significant increase in P15 gene expression after differentiation to erythroid lineage, suggests the remarkable efficacy of this gene in erythroid function. According to upregulation of P15 gene after differentiation despite unchanged methylation status and slight down regulation of P16 gene with slight hyper-methylation of the gene it can be suggested that although the methylation can affects the expression level of P16 gene, the P15 gene is not affected by this mechanism during erythroid differentiation mediated by EPO.

Keywords: Methylation, gene expression, stems cell, erythropoietin, differentiation

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